USGS Landsat Data Continuity Mission (LDCM)

Data Product Considerations

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* Work performed under U.S. Geological Survey contract 03CRCN0001

Landsat Standard L1T

- **Scope requirements / community feedback via Pilot**
  - Landsat infrastructure
  - Sufficiency of network bandwidth
  - Appropriate processing parameters
- **Pilot Dataset**
  - US only – includes Alaska and Hawaii
  - L7 ETM+ SLC-off only – 2003 to present (and ongoing)
  - < 10% cloud cover, quality = 9
  - Geodetic control: Geocover
  - Digital Elevation Model: NED
- **Routine product generation (versus on-demand)**
- **Available via FTP**

Policy resolution required prior to implementation

Parameters of Standard L1T

- Parameters based on:
  - Current ordering statistics
  - Vetted through Landsat Scientists

- Pixel size: 14.25m/28.5m/28.5m
- Media type: Download (no cost), CD/DVD ($50)
- Product type: L1T (terrain-corrected)
- Output format: GeoTIFF
- Map projection: UTM
- Datum: WGS84
- Orientation: North up
- Resampling: Cubic convolution
- Accuracy ~30m RMSE (US), ~50m RMS (global)

LDCM Standard L1T

- **Standard Product**
  - Some details TBD pending award of OLI RFP
  - Looking to gauge bandwidth requirements based on Landsat L1T Pilot study
  - Nomenclature (L1T vs. L1Gt) to be resolved depending on whether ephemeris needs to be augmented by ground control to meet Landsat L1T accuracy, or if desired to improve upon accuracy
  - Looking to feedback on Landsat L1T Pilot study processing recipe
- **Routine operations**
  - Global coverage
  - Commence at onset of operations
  - Cloud cover and data quality criteria TBD
    - May relax cloud cover to enable cloud reduced compositing
    - Minimal cloud cover and data quality constraints allowable to achieve geodetic accuracy requirements
  - Use of “best available” DEM data
  - DEM including with image data as product package
- **Routine product generation (versus on-demand)**
- **Available via FTP (“web-enabled” access)**

Policy resolution required prior to implementation

LDCM Standard L1T

- Parameters based on:
  - Feedback from Landsat L1T Pilot
  - Need for consistency with heritage Landsat products

- Pixel size: 14.25m/28.5m/28.5m
- Media type: Download (no cost), CD/DVD ($50)
- Product type: L1Gt or L1T (pending, need for GCPs)
- Output format: GeoTIFF
- Map projection: UTM
- Datum: WGS84
- Orientation: North up
- Resampling: Cubic convolution
- Accuracy ~12m 90% (CE) global

LDCM Data Products

Assumptions

- **Standard Product – available at onset of operations**
  - Generated routinely or on-demand
  - WRS-2 scene-based L1T product, fixed recipe
  - Processing may be constrained by percent cloud cover
  - Geolocation accuracy achieved using ground control
  - Relief displacement corrected using best available DEM
  - Web-enabled access for electronic retrieval
- **User-specified products – introduced later in Operations & Maintenance**
  - Products generated on-demand by user request
- **Need to solicit input from the user community on the levels of processing and delivery services that are required**
  - What products does the community need?
  - How are these needs met most effectively?
  - Standards for data format and metadata content to enable web services
  - Need to address consistency with legacy Landsat products

LDCM User-Specified Products

***Some thoughts regarding the types of user-specified products that would be generated on-demand.**

- **Levels of radiometric processing**
  - At-sensor radiance
  - At-sensor reflectance
  - Brightness temperature
  - Surface reflectance
  - Surface temperature/emissivity
- **Levels of geometric processing**
  - WRS-2 scene-based L1T from online inventory
  - WRS-2 scene-based L1T from archive
- **Multi-temporal synthesis**
  - Scene-based cloud reduced composite from standard L1Gt product
  - Hyper-temporal “Data Cubes”
    - Based on WRS-2 path/row
    - L1T with common projection and resampling

*****Requires policy clarification with USGS Land Remote Sensing Program Management